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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

MAILED

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GROUP 3600

Application Number: 10/802,104
Filing Date: March 16, 2004
Appellant(s): CRIST, ROBERT J.

JEFFREY C. METZCAR
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 17, 2007 appealing from the Office action mailed March 7, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of claims

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 1-9, 11, and 24.

Claims 10 and 12-23 have been canceled.

(4) Status of Amendments after Final

The Appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of claimed subject matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of rejection to be reviewed on appeal

The Appellant's statement of the grounds of rejection to be reviewed on appeal in the brief is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence relied upon in the rejection of claims under appeal.

6,345,430	Haga et al.	February 12, 2002
Harris' Shock & Vibration Handbook	Harris et al.	2002

(9) Grounds of rejection

The following grounds of rejection are applicable to the appealed claims:

Claims 1-9, 11, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haga et al. in view of Harris' Shock and Vibration Handbook.

Regarding Claim 1, Haga teaches a vibration damper for damping torsional and bending vibrations in a rotating shaft (a crankshaft. *Ibid.* col. 3, line 24-33) having an axis of rotation (unnumbered in the figure), the vibration damper comprising:

a hub 1 adapted to be coupled to the shaft for rotational movement therewith;

an inertia element 2 concentric with the hub 1; and

an elastic element 4 adapted to non-rigidly couple the hub 1 and the inertia element 2.

Haga teaches the invention substantially as claimed. However, Haga does not explicitly teach that the material of the elastic element possesses different first and second shear modulus in first and second directions.

Harris' Shock and Vibration Handbook (hereinafter "Harris") teaches the well-known material (see, *e.g.*, Table 35.5 on pages 35.6 and 35.7) that possesses different first and second shear modulus in first and second directions (axial and transverse directions) in order to dampen the shock and vibration. It is well settled that the selection of a known material based on its

suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) and MPEP 2144.07.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the well-known elastic material that possesses different first and second shear modulus in first and second directions in order to dampen the shock and vibration in Haga's damper as taught or suggest by Harris.

Regarding Claim 2, Haga's elastic element 4 comprises a composite material. *Ibid.* col. 3, lines 34-45. In addition, Harris' material is also a composite material. See page 35.6

Regarding Claim 3, Harris' composite material comprises an elastomer having a plurality of fibers dispersed therein. See, e.g., page 35.6.

Regarding Claim 4, Harris' fibers are dispersed within the elastomer in a unidirectional orientation. See, e.g., last paragraph on page 35.6.

Regarding Claim 5, Harris's plurality of fibers (carbon/graphite and Kevlar fibers) are dispersed within the elastomer in a longitudinal (axial) orientation with respect to the elastic element. See, e.g., last paragraph on page 35.6.

Regarding Claim 6, Harris' plurality of fibers (carbon/graphite and Kevlar fibers) are dispersed within the elastomer in an axial orientation that is parallel to the axis of rotation. See, e.g., last paragraph on page 35.6.

Regarding Claim 7, Harris' plurality of unidirectional fibers are capable of being dispersed within the elastomer in a radial orientation with respect to the axis of rotation. See, e.g., page 35.3 wherein Harris teaches the orientation of fibers in the 0^0, $+45^0$, -45^0, and 90^0. On

the other hand, the orientation of Harris' unidirectional fibers in Haga's damper would have been a matter of choice in design since the claimed structures and the function they perform are the same as the prior art. *In re Chu*, 66 F.3d 292, 36 USPQ2d 1089 (Fed. Cir. 1995) citing *In re Gal*, 980 F.2d 717, 719, 25 USPQ2d 1076, 1078 (Fed. Cir. 1992).

Regarding Claim 8, a first surface 6 located on Haga's inertia element 2 is spaced radially outwardly from a second surface 5 located on the hub 1, and the elastic element 4 is located between the first surface 6 and the second surface 5.

Regarding Claim 9, an outer surface 2a of Haga's inertia element 2 is adapted to receive a power-transmitting belt. *Ibid.* col. 3, lines 42-45.

Regarding Claim 11, an outer surface 1d of Haga's hub 1 is adapted to receive a power-transmitting belt. *Ibid.* col. 3, lines 42-45.

Regarding Claim 24, Haga teaches a vibration damper for damping torsional and bending vibrations in a rotating shaft (a crankshaft. *Ibid.* col. 3, line 24-33) having an axis of rotation (unnumbered in the figure), the vibration damper comprising:

a hub 1 adapted to be coupled to the shaft for rotational movement therewith;

an inertia element 2 concentric with the hub 1; and

an elastic element 4 adapted to non-rigidly couple the hub 1 and the inertia element 2.

Haga teaches the invention substantially as claimed. However, Haga does not explicitly teach that the anisotropic elastic material having different first and second shear modulus in first and second directions.

Harris teaches the well-known anisotropic elastic material (see, *e.g.*, pages 35.3 and 35.6, and TABLE 35.5 on page 35.7) that possesses different first and second shear modulus in first and second directions (axial and transverse directions) in order to dampen the shock and vibration. See *In re Leshin* and MPEP 2144.07, *supra*.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the well-known anisotropic elastic material that possesses different first and second shear modulus in first and second directions in order to dampen the shock and vibration in Haga's damper as taught or suggest by Harris.

(10) Response to argument

I. Drawing Objections

The objection to the drawings is not an appealable matter. Thus, Appellants' statements related to the drawing objections are immaterial. MPEP 1201.

II. 35 USC 103 Rejection

Appellant submitted that the rejection should be reversed by the Board as based upon impermissible hindsight guided by Appellant's own invention.

The issue presented is whether it would have been obvious for one of ordinary skill in the art to substitute Haga's elastic element 4 by Harris' anisotropic elastic material.

While there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, "the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007).

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability.
>
> For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Id. at 1740, 82 USPQ2d at 1396. The Examiner must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.*

At the outset, on page 7 of the brief, Appellant admitted:

> Applicant admits that vibration dampers having a hub and inertia element with altered joint geometries, and an elastic element for rotating shafts are known. In fact, Applicant specifically distinguished them from the claimed damper in the Background section of the application. *Applicant further admits that anisotropic materials are known that possess different properties, including different shear moduli, in different directions.* (Emphasis added).

In the instant case, Haga shows a vibration damper having a hub 1 and inertia element 2 with altered joint geometries, and an elastic element 4 as admitted. In addition, Harris teaches the anisotropic material for shock and vibration damper. For example, Harris' Table 35.5 on page 35.7 describes "[t]ypical fiber properties are presented in Table 35.5, where the degree of individual fiber *anisotropy* is indicated." This Table 35.5 listed the fibers such as E-glass, S-glass, Kevlar, and AS4 carbon. Moreover, Harris' Table 35.5 shows two column "Axial elastic modulus" and "Transverse elastic modulus." As seen in this Table, the axial elastic modulus and the transverse elastic modulus of the listed fibers are different in axial and transverse directions

for the materials, such as, Kevlar 49 and AS4 carbon. The shear modulus of the listed fibers in axial and transverse directions are different therewith because the shear modulus is proportional to the elastic modulus or Young's modulus. This fact is notoriously well known based on standard textbooks of material science or scientific dictionary as evidenced by, *e.g.*, the description of "Relation to Poisson's ratio and Young's modulus" in the free encyclopedia *Wikipedia* cited in the final rejection. This fact is confirmed by, *inter alia*, Harris' page 35.3+ and FIGS. 35.4- 35.6 wherein Harris teaches "Special Design Issues and Opportunities" in multiple directions. In addition, pages 35.12-35.18 of Harris explicitly discusses about the composite in which those fibers are embed to dampen the vibration in multiple directions, particularly, the shear coupling or shear modulus.

The modification of Haga's vibration damper by substitution of Haga's elastic element by Harris' anisotropic elastic element to dampen the shock and vibration would not have been uniquely challenging to a person of ordinary skill in the art because it is no more than "the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement." *KSR Int'l. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007). Therefore, this substitution appears to be the product not of innovation but of ordinary skill and common sense. Hindsight is eliminated in this instance since Haga and Harris are not only in the same field of endeavor (vibration control) but also solve the same problem (vibration) by substantially the same way (using elastic element). The results of having "*different shear moduli in different directions*" are predictable since they are inherent characteristics of the anisotropic material as Appellant admitted above. *See Sakraida*, 425 U.S. at 282, 189 USPQ at 453.

In summary, Claims 1-9, 11, and 24 were combination which only unite old elements with no change in their respective functions and which yield predictable results. Therefore, the claimed subject matter would have been obvious. *KSR*, 127 S. Ct. at 1740, 82 USPQ2d at 1396.

Finally, with respect to Appellant's arguments about the Examiner's citation of *Wikipedia* on page 8 of the final rejection, Appellant noted that the equations on *Wikipedia*'s shear modulus, Young's modulus, and Poisson's ratio are for isotropic materials, not anisotropic materials. However, Appellant did not provide any evidence to show as to why these equations are applied only to isotropic materials. Assuming *arguendo* that these equations are applied only to isotropic materials, as noted, Appellant admitted that "*anisotropic materials are known that possess different properties, including different shear moduli, in different directions.*" Simply put, Harris' anisotropic materials posses different shear moduli in different directions as claimed regardless whether the equations in *Wikipedia* are applicable or not in the case at hand.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the Examiner in the Related Appeals and Interferences section of this Examiner's answer.

CONCLUSION

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Primary Examiner

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